

WALDO L. SCHMITT - TORTUGAS NOTES
 1930
 July 9 - August 18
 STATION RECORDS

July 10, 1930

#1 - 30.

White hermit from hole in old piece of coral rock (frag.) in 2 ft. water, and a Sicyonia, from old tire filled with hermits, C. tricolor. Both from east side Loggerhead swimming beach, off sleeping quarters. Also Squilla from another hole in piece of coral.

#2 - 30

Afternoon, between 3:30 and 4:30 on Bush Key Reef, channel end (south). Chloride of limed 2 tide pools. Got some fish and few Mithrax, Squillas, and Microphrys, 1 or 2 hermits. Crustacea are made active but not nearly so affected as fish, if at all. Got 2 of viviparous little fish that Dr. Longley thought rare, like little yellow or dull orange liparid.

Three amphinomids, large one about 120 mm. 2 figs
 long when moderately extended. Caruncle plicate.
 Back olive green, gills more olive, sides and ventral olive buff. Between each two somites line of jointing is olive yellow. Two smaller worms salmon color top, sides, and bottom, first third salmon and last fourth intervening distance with drab grey tinge. In locomoting ventral bundles of setae are spread out fanwise, very much so, and are apparently very efficient paddles. Darker narrow stripe of green down mid dorsal line.

I went out on west side of Loggerhead between cook house and half way to lighthouse pier and saw but one or two hermits in all. True, it was high tide, about 11:00 a.m.

July 11, 1930.

#3 - 30. Hard, stony coral bottom. Av. $2\frac{1}{2}$ fms. on south end.

Brilliant Shoal, boat dredge 4 hauls. One Podochela, color like piece of dead coral rock. One Palaemon ? eyes with merest tinge of apple green for cornea, and mere spot of Van Dyke brown where stomach is located. Two little Synalpheus, milky transparent one with larger right chela, with ochraceous buff alimentary tract except intestine with foregut tawny with lighter stripe down middle longitudinally. Other one with light apple green ovaries and few large oil green eggs, burnt umber foregut and eyes, rest of stomach region ochraceous buff as above.

#3a - 30.

Six hauls on small shoal between south end Brilliant Shoal and north end Loggerhead Shoal. Miscellaneous invertebrates, isopods from millepora cysts or galls. More weedy, grassy bottom, but still lots of coral.

#4 - 30.

Afternoon from 3:30 - 6:00 p.m. "Channel" (north) end of Bird Key Reef. Collected over rocks on outer side or northwest corner. Lumpy Actea, tops of granulated nodules brick red more or less mottled and particularly hinder and outer edges with ~~lx~~ light vinaceous cinnamon in sulci throughout about

pinkish buff



Hand mostly whitish (crosshatched) fingers and lower border of palm for about half distance seal brown, granules hazel; corneae same; other color of hand like carapace. Under parts porcelain white, becoming more buff toward margins and under part of legs speckled with ? brick red one large conspicuous spot on each coxal joint

[See ~~pp. 2a + 2b~~ following pp. 2a + 2b for color notes on Crangon and Synalpheus.]

~~Little black crab:~~

Little black crab: shiny black carapace and chelipeds, with some gray #7 light color markings. Eyestalk with long stripe of #9 gray. Legs white with few black lines practically concealed by brushy hairs of cream color, but more drab or dull cream color.

#4-30 Little red handed, white bodied Synalpheus.

Body pale transparent, apple green, lighter behind and darkest in stomach mass color runs up to base of fingers in smaller cheliped and along outer margin of movable finger; and on to base of larger cheliped where it is almost whitish before red begins. Anterior half and fingers of large cheliped and fingers of smaller cheliped most brilliant and striking rose red, fingers little paler because thinner, and little paler toward whitish half of hand, deepest approaching ant. of movable finger and at base of fixed finger and adjacent palm.

figs & notes

Legs are carmine speckled principally on upper surface of propodus and next on sides of propodus very sparsely, if at all, elsewhere. Chiefly on last ambulatory, less so on more anterior apirs, which have little patch on distal end of carpus and scarcely more than line on rest of carpus and propodus, proximal joints free of spots.

#4-30

Medium sized Crangon, pale olive green all over. 3 specimens are in vial, and one other little one ? greenish fingered Synalpheus?

2 finger notes

Hinder margin of each somite and rostral triangle appear tawny olive, but on close inspection appear to be tiny crimson speckles on the greenish ground.

Dark shaded areas between tawny & tawny olive, nearer former. Spots olive.

Legs greenish tinge, practically transparent. Antennae closely ringed with olive, giving them a greenish cast. Small hand tawny X tawny olive like larger with fingers darker, almost Vandyke brown.

Larger plain brown Crangon colored like preceding, but more uniformly so, large hand practically one color, movable finger becoming lighter toward tip, extreme tip translucent china white.

July 12, 1930

#5 - 30. Mid Section Bird Key Reef (really northern part of south section-- there seem to be only two parts this year).

Outer margin of reef gone over. Chloride of lime showed up some crustaceans that would otherwise have not been seen. Got a dose of Amphinome spines in finger.

July 13, 1930

#6 - 30. Boat dredge.

Left at 8:20 a.m. At No. 2 Red buoy log. 50.6 course S. Sounding at 8:50. Boat dredge 18-20 fms. = 18 fms. due S. of buoy. Net over at 8:54, up at 9:10. Sounding = 20 fms. Bottom sand and forams. Partheopid crab.

#7 - 30. Boat dredge at 20 fms.

Net down at 9:30, 20 fms.; up at 9:45, 20 fms. Soft grey muck. Many valves of small bivalves, 2 shrimps and scyllarid, many very tiny shells (empty).

#8 - 30. Boat dredge 35-40 fms. At 10:15 sounding 35 fms.; 10:35 start up, 40 fms. Very little mud. Lyreidus (*Raninoides loevis*) with red flecks on under side at base of antennae. Alpheid shrimp, red speckled with radiating lines of spots radiating out and forward from eyes, over scales and antennal and antennular peduncles. See p. 160 for sketch.

#9 - 30. Boat dredge 60-80 fms.

Sounding at 10:40, 60 fms., net over at 11:00 a.m.. Start up at 11:15, 8 fms. at end.

July 13, 1930

#10 - 30. 30 ft. otter trawl in 80 fms. beginning and end. At end 69 $\frac{1}{2}$ side Gee
 12:00 noon, 80 fms. Net over at 12:05. Start up at 12:55, on deck
 1:30 p.m. Clean haul. Great many large spider crabs, fishes of several
 kinds, and dead and broken urchin shells, some with sea anemones attached,
 other anemones of same kind attached to shells and to crabs themselves. Barnacles
 on spider cribs, within and without.

Hauls with otter trawl

| Depth fms. | Ph | Ph Base | Temp. | Sal. |
|------------------|-----|------------|-------|-------|
| 0 | 8.3 | 27.7 | 20.49 | 36.09 |
| 2 | 8.5 | 26.3 | 20.48 | 36.07 |
| 10 | 8.5 | 27.0 | 20.43 | 35.99 |
| 25 | 8.2 | 28.1 | 20.71 | 36.47 |
| 50 | 8.0 | 26.3 | 20.43 | 35.99 |
| 69 $\frac{1}{2}$ | 8.1 | 27.6 | 20.42 | 35.97 |

Started back at 3:00 p.m. *Acanthocarpus munidas*

Log reading 54.35

Log reading at 4:40 p.m. at red No. 2 buoy 68.35

=14 knots

At 4:55, s.e. end buoy on way home

70.60

in 15 min.

2.25 knots

=9 nautical miles per hour.

Back at 5:15.

*Should then
be specified
differently?*

July 14, 1930

#11 - 30. Course S. 30 ft. otter trawl in 117-0 fms.

At 8:30 a.m., log 71.90

10:06 " " 85.90

Sounding 70 fms., Run 10.08

10.22 Sound 117 fms.

At 11:20 417 fms. cable out

11:30 475 " " "

11:45 500 " " "

2 Phronimas in tests, one with young inside, other with male attached

at one end; 1 Argyropelicus.

#12 - 30. 30 ft. otter trawl in 80-60 fms. 14 miles S.

Run back till 2:20, net over in 80 fms. on due west course. 2:43 p.m.

305 fms. cable out. Haul in at 3:20, on deck at 4:00, 60 fms.

Got a single Balanus amphitrite on waterlogged mangrove root (to Visscher).

Haul much like #10 - 30. Soft mud. Fewer spider crabs, but about as many

matutas, ~~ex~~ a Munida and an Axius, couple of small anemones and barnacles on the

spider crab. Got largest ^{sp?} Stenocinopsis seen in either this or #10 haul.

July 15, 1930

#13 - 1930 15 mi. S.

At 8:25 a.m. at buoy log. 41.8 course S.

At 10:08 a.m. log. 55.0

Turn due west at 10:14 to 10:18. Sound at 10:20 = 80 fms. Net over, made 1 five, one two-minute townet haul full of muck.

Course SW x S)
) 30 foot otter haul
 240 fms. cable.)

Haul in started at 11:54, up at 12:25 p.m. Sounding = 150 fms.

Empty haul, scarcely touched bottom. Siphonophores, salp, and 2 crabs.

#14 - 1930 Sea urchin haul. ? 150-110 fms.

Course from last Sta. N. by E. Net over in ? 110 fms. at 12:25, on bottom at 1:10. Haul in at 1:52, at surface 2:35 p.m. Start home at 3:05, 1 hr. & 35 min. to No. 2 buoy. Soft grey mud haul. No end of urchins. Some crabs. Hermit crabs and shrimps color noted. Quite a number of Raninas and Acantho- carpus, as in ~~ap~~ all preceding hauls.

~~#15 xxx 30.~~

July 16, 1930. 10-12 fms. 30 ft. otter ~~xxxx~~ trawl.

#15 - 30.

Down channel as indicated on chart. Nice weedy haul. Crustacea on large ochraceous Synalpheus, and some smaller ones, 2 Stenorhynchus.

#16 bis.

Haul that would have been #16, cable broke net lost, boards and all. Mills and men spent all afternoon hunting net, diving hood and all. Buoy was thrown out to make place.

July 15, 1930

#13 - 1930.

At 8:25 a.m. at buoy log. 41.8, course S.

at 10.8

July 17, 1930=18 on my labels.

Started out to hunt net, but water too rough to even pick up buoy. On way back got two small loggerhead sponges not far off docks (west side).

#1, larger, sponge--bottom of sponge could scarcely be crammed into pail; top diameter of sponge 320 mm. x 260 mm. high.

#2 sponge sat nicely in same sized pail about 2 inches below rim; top diameter 260 mm. by 190 high. One size due to pc. broken out bottom on getting it up with sponge hook, about 160 high from middle of triangular pc., about 4-6 on base.

July 18, 1930. Another day too windy for hunting trawl.

#16-30

Collected hermits east and west sides Island. Low tide 9:45 a.m.

On east side strong wind and waves made it very difficult to pick up specimens.

In deep quiet crevice where there was a clump of millepora on a rock, picked off hermits between branches (all branches low, more an encrusting form).

All Calcinus tibicen (2 tiny, 2 small, 5 medium, 1 large - total, 10). Too difficult in rush of waves breaking over rock to look farther in cleft

parallel to shore; perhaps could have gotten more. On rocks got 2 Neritina
1 Paletta

Off rock-carrying millepora got coral with barnacle to Visscher, and out of holes in it 2 Alpheids (bottled separately and color~~noted~~).

#16 & 17 - 30, East side Loggerhead Key, from Rocks, S. of Lighthouse dock.

July 18, 1930 - Continued

#17 - 30.

From a sea urchin pocket right at crest of rocks in full force of waves, which I enlarged, also had cleft, rather crack, perpendicular to shore, got: Clibanarius tricolor (7 large or fairly large (small), 36 tiny to small, 24 tiny, total 67. Very sheltered, removed sea urchin to which some tiny hermits were sticking. From urchin cavity big one for 2, but containing one one urchin. And 5 neritina from tops of rocks in full wash of waves, little pycnogonid from pc. of ~~wee~~ weed included.

#18 - 30. Under 2 ft. water.

Under overturned rock on flat of ledge south of lighthouse dock, west side Loggerhead Key, outside, or toward outerside of, rock. Calcinus tibicen: 3 tiny, 9 small, 9 medium, 3 large, (fairly), total 22, 1 Paguristes grayi in Conus, 1 little mithrax, 1 Clibanarius tricolor from ~~side~~ cleft higher up on rock ridge, quiet water, 1 neritina, 1 Littorina, 2 Calliostoma?

#19 - 30. West side Loggerhead Key.

Outside on sloping flat of rock under little water, with active wave action, west side, south of lighthouse dock, water not over foot deep:

9 medium sized Calcinus tibicen

3 Neritina.

July 18, 1930 - Continued

#20 - 30. West side

On surface of flat rock almost but not bare of water, hermits just submerged in quiet, almost standing water behind line ~~ax~~ of rocks:

19 *Calcinus tibicen*

{ 1 large?
3 near large
15 med.

26 *Clibanarius tricolor*

{ 1 very tiny
3 tiny
12 small
3 med.
7 large

Good wave action both sides island this day; strong wind day before, ~~and~~ ~~and~~ most of night, and all morning. Of course, east wind makes stronger waves on east side.

#21 -- 30. West side Loggerhead Key.

In quiet tide pool behind sheltering ledge of rock and between it and slope of beach in shallow quiet rock bottom pool. Pool not over foot deep.

90 *Calcinus tibicen*

{ 5 fairly large
54 med. & small
28 small
3 quite small to tiny

104 *Clibanarius tricolor*

{ 1 large
4 med.
14 small
85 tiny, inclusive of about a dozen very tiny

#17 - 30.

From a sea urchin pocket right at crest of rocks in full force of waves,
which I enlarged, also had cleft, rather crack, perpendicular to shore,
~~xxxxxxxxxx~~ very sheltered, removed sea urchin to which some tiny hermits were
sticking. From urchin cavity

July 19, 1930.

#22 - 30. Inside northern section of reef, toward channel side, in knee-deep water.

Over on Bird Key reef, presumably at low tide, waves quite high at 11:00-11:30 a.m.

From a dead conch (Strombus) shell shook a small Synalpheid, very light colored and transparent. Color noted on yellow sheet. White and one light reddish amphipod taken from brilliant red sponge, color of red lead. Piece saved. Isopod bottled with Synalpheus above from cavity in old Strombus, that had been overgrown by sponge. Also squilla in a tunnel under sponge.

Picked up a piece of honeycombed rock with hermit shells on it, 11 in all. 1 = Calcinus tibicen, rest hairy grayish with purple markings, color noted on yellow sheet. Also one shell Calliostoma.

#23--30.

Worms and one tiny squilla from large rock brought up by Mills off reef west side Loggerhead Key, little to south of dock.

July 20, 1930.

Got five *Grapsus grapsus* off of North sea wall with dip net, and one small black cross-barred alpheid from empty Conch shell. Between capture and lab. were out of water in wire cage for about $1\frac{1}{4}$ hrs. Got two drenchings water poured over them from quart bottle. In lab cage was set in bucket ~~XXXXXXXXXXXX~~ of water and crabs went down below water level in dark of bucket. Largest showed tendency to climb out of water and sit up ^{on wire cage side.} ~~Had~~ Had been in water about 2 minutes, when, at 1:25 p.m., transferred

At 6:50 \pm a.m. noticed that the smaller of the two crabs in sea water had died, likewise the little one on sand. Large crab in salt water could raise itself (body $3/4$ sideways) out of water, and I often found it in this attitude. Small crab in salt water could not do this. This one died Aug. 3, 1930--died night of Aug. 2, was very feeble that evening, died of starvation. Large one in sea water was trying to get out, but still as active as when first put in. Also the 2 med. sized ones in dry aquaria. Fecal matter removed with tube from large salt water crab, and little water added to replace that removed.

Last evening ^{young} ~~year~~ Longley brought me 2 *Grapsus grapsus* (also got a *Plagusia depressans*^a) which were kept in a bucket with wire cage over over it over night. One was up on side of cage this a.m. and smaller of two in water. This later was put into fresh water from which dead one was taken. Of course water was renewed first. The crab left in wire cage in bucket died about or before 6:25 a.m. July 29, 1930. Got hung up in piece of string attached to webbing on bottom of cage, which I left so the 3 ? 2-clawed fellow would climb up on wire. At 11:20 put new crab on sand; died prior to 6:00 a.m.

July 22.

where does this → belong?
In same aq. this was filled with water so crab could not raise body out of water.

July 21, 1930 #24-30 9.00 a.m.

Collected hermits off N. end N.E. sea wall, Ft. Jefferson, to right of first break in sea wall, on "grass" growing on wall.

11 Calcinus

4 med.-lg.

7 small

193 Clibanarius

17 med.-lg.

176 small to tiny

These crabs were on wall at or immediately below water line.

July 21, 1930

#25 - 30. ~~Collected along~~

Collected along N. sea wall at and just below water ~~ixk~~ line wash of waves, 9:00 - 10:00 a.m. Got:

| | |
|-----------------------------|------------------------------------|
| 63 Calcinus | 41 Clibanarius |
| 24 med. o -large | 2 large |
| 39 small | 39 small - few few tiny |

24 mollusks, tied in rag in tank.

#26 - 30.

Collected on footing of sea wall at intervals below preceding, grabbed handful now and then. 18 inches ^h to 2 feet ~~gs~~ below water line. Got:

| | |
|-------------|-------------------|
| 19 Calcinus | 510 Clibanarius |
| 7 large | 10 large |
| 3 med. | 500 small to tiny |
| 9 small | |

1 small Paguristes grayi, 1 with mollusks

3 Mollusks tied in rag in tank

27 - 30.

Collected around N.E. bend of sea wall, water deep, over my head at high tide, open and exposed and strong current. 10:00-10:30 a.m. Got:

| | |
|------------------|--------------------------------------|
| 53 Calcinus | 65 small, tiny Clibanarius |
| 10 large | |
| 43 med. to small | 10 mollusks tied in sep. rag in tank |

July 22, 1930.

A.M. went out to East Key, but as tide was full, trip was useless. Visited Sand Key on the way, no collecting. Water full of Ctenophores this a.m., but got nothing but fragments in townet. Noticed them when swimming, each stroke
 ? ?
 mass of jelly.

#28-30.

Collected east of Fort landing dock; Fort Jefferson, waterglass, took clumps of Porites in dip net and specimens came out of that. Several small shrimp, a larger striped one, and a black cross-barred alpheid. From interstices of coral head (which had "pockets" or nooks into which they could withdraw between coral colonies) got about 5 *Mithrax verrucosus*, couple of hermits, 2 mollusks, 1 bivalve, 1 gastropod with red algae over outside; a small *Upogebia* from among Porites, probably hole in rock base of dump. Heads on edge of shoal west side Ft. Jefferson on south edge of this shoal.

July 23, 1930

Photo'd on Bird Key

| | |
|-----------------------|------------------------|
| Whitish young = noddy | 85% sorting |
| Blackish " = soot | 50,000 to 75,000 birds |

#29-30

Collected on Bush Key Reef on inside, Fort side. Examined *Strombus* shells, got 2 large hermits and 2 others on flat of reef. Also looked over coral heads; got a small *Stenopus* out of one, mostly red, maybe a young *hispidus*. Picked up a dead *Pitho* shell on flat of reef.

Visscher gave me two coral gall crabs cracked out of coral; also got two lumps with crab holes in them myself. Also got a little striped shrimp (*Hippolyte?*).

July 24, 1930

Put three hermits in dry jars (2 *Paguristes grayi*, 1 *Petrochirus balanensis*). Had been in running water aquarium over night; were good and active this a.m. (from #29-30). 9:00 a.m. water drained from shells. 12:30, could only see *Petrochirus* in shell, 2 *Paguristes* 'way back. Large *Grapsus* in water was holding hinder part of carapace out; other one half out of water on side of cage. Dessication experiments don't prove anything; man without water can live to days, *Grapsus* less than 12-24 hrs., which is perhaps an equally great span in life of crabs, and does not tend to show any greater or less degree of approach to attaining dry land habitat. Ocypode, in the years we have been recording its habits and behavior since the days of Aristotle, is no nearer independence of the sea than when it first became Ocypode.

#30 - 1930.

Went down with hood off reef west side of Loggerhead about half way between Lab Dock and lighthouse dock in 12-15 feet of water, among coral heads that arose from scoured sandy flat of broken coral east of eel grass patches to within nearly (about) six feet of surface. Brought up few rock fragments and one *Porites* clump, broke up in bucket, few things saved.

So far have first showed barnacles in *Millepora*. Found *Crusea* in lumpy coral and in *Agaracia* and *Porites*. On dredged shell got *Verruca* and *Balanus* from mangrove root.

#31 - 1930.

On rocks below (S.)^{of} lighthouse dock, east side Loggerhead Key, low tide 3:49 p.m. With tonsil retractor got several *Plagusia depressa* and one *Percnon gibbesi*. *Mithrax verrucosus* put in dry aquarium jar at 5:50 p.m., *Plagusia depressa* ditto at 5:40 p.m. All finds this day except *Pachygrapsus*, *Microphrys*, and large crabs, from under thin sheet of encrusting coral, which

July 24, 1930 - Continued

[was] pried off rock and revealed cerise red banded alpheid with deep green body, rough backed tiny Pilumnids and Alpheids, color noted, as well as little jet black Paralimnerus with white legs. Octopus had one Plagusia, I captured, had at least two tentacles wrapped over it.

July 25, 1930

Plagusia and Mithrax dead at 6:00 a.m., well evening before.

Cleaned up specimens on tables; rain this a.m., nothing else done.

32-30 Collected on south, channel, end of Bush Key Reef, over lower end where surf washes over. Got number of hermits:

| | |
|--|----------------------------|
| 31 Calcinus tibicen | 1 Paguristes grayi |
| 3 large | 3 little grayish hermits |
| 7 medium xxxxxxx | |
| 7 medium to small | xxxxClibanarius |
| 14 quite small to quite small | |
| (1 = tiny) | |

No Clibanarius tricolor. Water too rough or too much motion for Clibanarius, or has it receded to deeper interstices between coral fragments which I did not explore? Plenty of Thoe on under side of larger rocks lining deeper channels lining reef near southern or channel end. Also got one Paguristes grayi along with other hermits and a large Mithrax spinosissimus on outer southern end of reef. Visscher got a barnacle off this.

Petrolisthes is very ~~xxx~~ active swimmer, at least the little ones, and I opine big ones, too, for they are impossible of capture once they leave the rock on which you may find them. The little ones in a dish are exceedingly quick and active swimmers if disturbed. Cannot get big ones to swim in dish ten or so inches across.

The little fellows are cream color, with fine transverse ~~lingings~~ of between ochraceous rufous and orange ochraceous, and scattered chestnut spots;

July 25, 1930 - Continued

[there are small white spots all over, and teeth on anterior margin of carpus are a bright china white; there is a conspicuous fleck of ochraceous rufous on anterior margin of propodus of each walking leg; inside of mouth parts; same is true of large purplish blue between lines of back.

Punct.?
Galathinus has ochraceous x ochraceous rufous propodi with a maroon fleck on anterior margin. Teeth of anterior margin, ridge near hinder margin, and hinder margin flecked with intensely bright, almost luminous, azure blue.

July 26, 1930

#33-30. Off west side Loggerhead Key.

Brought up Porites clump in bucket. Little Petrolisthes on it that mimic red encrusting alga, color noted.

Was down in diving hood, but saw nothing over turtle-grass but fishes. Got a little crab and two Mithrax off fragments of dead coral. Visscher lost Mithrax while looking over coral.

July 27, 1930, Sunday.

#34-30.

Spent about an hour and then 15 minutes more sitting on the bottom looking at crab holes in broken coral (small fragment zone). Saw several hole-building fish, which excavated their pits by bringing up a mouthful of sand and blowing it out on the circular heap surrounding opening; were but momentarily affected by my presence and soon went back to work. Saw several crabs in burrows (mouths of tunnels) but caught more after ^{2 hours} hours watching and occasional try. Hose did not ~~sample~~ comfortably reach to several I thought I could get. Came up after hour or 55 minutes, moved boat over and by getting close scared little brown-fingered Xanthid into his hole. He had been feeding on some junk near hole; it took him nearly entire 15 minutes I was on bottom to come out and feed again, when I shoved handle of forceps down behind him (I had it closed and poised for just such an eventuality). Proved to be ? a little Micropanope.

There was a little slender fish, with large brown bulging eyes, that came out of same hole to look around at about half-time, but saw him only the once. Many tiny Xanthids walked around among rocks (tiny, rough coral pebbles), digging in and under, lifting, heaving, and shoving about lumps several times their bulk, and sinking down out of sight every time I got near, so that, under hood, I could not see well enough to pick them out from among lumps with forceps. Got two *Clibanarius tricolor* and one little white (coral sand) grey hermit with few faint transverse hazel to tawny markings on legs. Thought I had another tiny grey hermit in tiniest of four shells, but do not find evidence of it in shell as I examine dish.

July 28, 1930, Monday

Captain Mills located net in 60 feet ~~at~~ after grapnels had been dragged into net, but in no part by which it could be lifted, he went down with hood. Quite a depth and hard work, big beads of perspiration standing out all over him; with run of tide and moving about took full 100 feet of hose. Out of net, #16 bis, got some sponges, few mollusks, Strombus of small species, amphipods, and one Petrolisthes if I can find it in debris to be sorted.

In a.m. Dr. Grave brought me two Palaemons, male and female, that had taken refuge in dish in his live car.

July 29, 1930

#35 - 30. 13 mi. S.

Log 18.1 at No. 2 buoy at 8:15 a.m.

Log. 30.4 at 9:45 a.m.

Sound. 60 fms. 3 mins. out for sounding.

Log. 31.8=80 fms. 9:57 a.m.

Net over at 10:00 a.m., hauled due W. 10:30 a.m. net on bottom.

Haul in at 11:25 a.m.; at surface 11:50.

Sounding 12 noon=100 fms.

Soft mud, but only traces left in net.

Birostrated fish, 3-4 kinds of flounders, 2 new fish, few urchins.

1 Porcellana

2 Ranina

Several Ethusa

7 ^{spiral?} spine shells, 3 saved

" Pyroma

" Acanthocarpus

" Leucosia

1 octopus

1 Phronima in test

July 29, 1930 - Continued

#36 - 30.

Sounded 12:10 = 120 fms.

Net over 12:15, on bottom 12:52 p.m., 350 fms. cable out. Hauled due east. Haul in started at 1:38 p.m.

Sounded while ship not moving at 1:45 = 120 fms.

Net up at 2:15; log over; log = 31.8

Made Red No. 2 buoy at 4:00 p.m., log = 46.2

1 hr. 45 mins. = 14.4 knots

Soft grey mud, traces in net. Few crabs? and few fish.

Fish stomachs out of #35-30 of July 29, 1930.

#1-1930

Urophycis regius

Larval fish
Pc. fish spines
Crangon chela, ant. part
Number of amphipods - 2 saved
& other unidentified debris

#2 & 3, 1930

Label 2 & 3
= fish #2
Hollandia sp. 2 specs. First had no end of amphipods, about 10 or 15 of 3 or more species. [Those] saved represented perhaps a tenth or less of mass of badly digested amphipods.

Fish #3

Hollandia bottled separately. 40-50 times as many amphipods represented in digested debris as saved.

Insert 4 + 5 from p. 21
Fish #6, species do.

Dozen or more Diastylus, fewer amphipods, considerable other debris digested.

Fish #7, species do.

Several amphipods, 3 saved
" Diastylis, perhaps 1 fit? to save
Other muck

Fish # 8, do. species

2 amphipods
1 Diastylis or ? ostracod
not much else outside of pieces in intestine

Fish #9, do. species

But 1 recognizable amphipod in quite good shape.
Nothing else but much digested stuff.

Fish #10, do. species

Contents blank.

Fish 11, 12, 13. These contents mostly out of 11 & 12; practically nothing in #13.

Callionymus sp., ostracods, tiny mollusks, forams, copepods, bottled separately ~~xxx~~ according to groups. Three other fish like third of these with nothing much in alimentary tract.

Fish stomachs out of #35-30 of July 29, 1930 - Continued

Fish #14 (Manter #425) Monolene sp.

Fish #15 (Mater #470) Coelorhynchus sp.

Copepods and amphipods most of those in contents.

*Insert
on p. 20*

| | | |
|---|------------------------------|--|
| { | Fish #4, Peristedion gracile | 4 amphipods badly digested 1 young fish saved with 1 amphipod |
| | Fish #5, do. species | Nothing much but digested debris from stomach. |

July 31, 1930

#37 --30. Otter trawl.

2 Aplysia taken in this haul. Kept by Div. Mollusks, Acc. #111167.

Log at 5:58 a.m. 41.9 first buoy

At #2 Red Buoy 6:14 a.m. 43.9

? Course ^{from?} South for No. 2 red buoy 16 min. 2 miles

8:14 sounding = 140 fms. log. 64.95

(180 fms., 19 miles south) 21. miles

Under way 8:20 a.m. Sound 180 fms. at 8:28 log. 65.65

1.30 miles more

Net over at 8:40 a.m. Course west. 695 fms. cable out on bottom

at 9:25. At 10:25 a.m. start haul in. Got 3 Bathynomus, larger $10\frac{1}{2}$ inches long.

$2\frac{1}{2}$ buckets Peneid shrimps

1 hermit

6-8 large Munidas discarded; half of these were regenerating one of the chelae

Large and small Munidas

About 250 of Peneid shrimps discarded & 4-5 of Munidospsis

currirostra? Small Munida (50-60) discarded = Munida longipes

1 Munida decora Benedict found in debris at bottom of ? bucket

Haul #38-30 220-237 fms.

At 12 noon, 220 fms. sounding. Net over right after, on bottom at 12:50, haul little short of 1 hr. Start haul in 1:47 p.m. Had difficulties with winch spread down. Near 3:00 p.m. before net was on deck. Sounded while ship was at a standstill at 2:37 p.m.; got 237 fms.

At 3:45 started back, course N.E. X N. log 65.65

50

15.65

At 5:10 p.m. course E. N.E.

log 25.70

Red buoy at 6:45 p.m.

log 34.60

15.65

3 hrs. = 28.95 knots, about 28 miles ±

July 31, 1930 - Continued

Got 5 Bathynomus and ~~vixn~~ five rocks, little clump of mud. Gave latter and 2 rocks to Gee. [Also got] 2 large Geryon & large Peneids
2 new hermits

15 of large package of Peneids given away.

Aug. 1 & 2, Friday & Saturday, 1930

Worked around lab putting up collections from deep sea hauls.

For large could find no name in Benedict.

Munidopsis and a bunch of Peneids for which I have no literature.

8 Bathynomus. Mrs. Searle gives 740 fms. as least depth.

3 first haul 180-220 fms.

5 second haul 220-237 fms.

Could not have been in more than 237 fms.

August 2, 1930 4:45

Phil brought me small Calappa thrown up by grouper he caught on reef off N.W. side of Loggerhead Key.

August 3, 1930.

Found Grapsus dead in jar partly filled with salt water so could rinse itself out. Was put in July 21, died night of August 2, as was very feeble in evening of second. ♂ Carapace 5.9 mm. greatest width.

#39 - 30

Captain Mills with hood collected over the reef outside 5 ft. channel between Bush and Bird Key ~~re~~ reefs for corals for Dr. Vaughan, and from debris resulted a Microphrys-like with dark purple hands ~~and~~ and cream? fingers (otherwise color noted) and five little Xanthids also color noted. ([Microphrys] must have been Mithrax holderi.--WLS, June 1931 note.) Also an ? apple green squilla.

August 3, 1930 - Continued

#40-30.

Young Longley got 2 little crabs from among turtle grass this day, two small Pitho and one smaller.

The two Upogebias were found in tube which I have complete all but the bend, I'm sure. Female was the only one that was noticed hanging out of cracked open burrow when brought me. Two external openings very small, just big enough for ventilation. Why the operculum, saved feces for diatom examination; also have bit ~~ix~~ of lining of burrow examined. This piece of bryozoan-encrusted rock was saved separately. Very common among shrimp of Callianassid type, these self-immured prisons, in which the happy couple live 'til death do us part. It is conceivable that death of one ends both, due to poisons of decay. The right-hand hole got poked twice as large driving the male out. I didn't know he was in there until I took another look into burrow in rock which I had purposely set up on end to drain and dry out quicker and better. What really called my attention to rock this a.m. at about 9:30 - 9:45 was little green clawed Synalpheus that had wormed his way out of one of the many holes to lie dead, but damp, not yet dried up, on surface of rock. But for the fact that I want to save the Upogebia burrow, I would have sought the mate to this ^{♂?} Synalpheus, which must still be in the rock. See color note.

Female gebia put in tow net juice, C.B. Wilson formula, for yellow tuft on back, which, after all, may be forced out ovaries.

August 4, 1930

#41 -30

Went down with diving hood and planted some glass tubes with 2-foot long stout wires beside as markers between dock and N. end of island. Also brought up hollow rock and some turtle grass, latter for aquarium, with small turtle saved

for Dexter. The rock had Squilla and Xanthid in it and 3 ~~Mithrax~~ Mithrax
 came out of eel grass patch.

Small Xanthid
 3 Mithrax
 Pseudosquilla

Got 10 Grapsus grapsus at Fort between 2:00 and 3:00 p.m., brought them
 back to lab at 4:00 p.m.

- A Put 1 in salt water deep enough to keep him swimming to stay up.
 B Put 1 in shallow salt water out of which he could raise himself
 C Put 1 in fresh water deep enough to keep him swimming
 D Put 1 in shallow fresh water out of which he could raise himself
 E Put largest and strongest in dry jar.

A, B, C, & D about equal size.

C found dead at 5:45 p.m. Quite limp. Tried to revive by putting first in
 salt water and then out on table in air at 5:50. Young male, greatest
 width of carapace 40 mm.

At this writing, Aug. 5, am not sure but what I got results of C & A mixed,
 but I wrote note last night & did put crab in running water aquarium and out
 on table in air afterward.
 August 5, 1930 7:00 a.m.

B Living & active this a.m.

- | | | |
|-----|---|---|
| A) | Both dead. Were alive and apparently doing | A♂ 38.3 mm. wide |
|) | | |
| D) | well last night at 9:00 p.m. | D♂ 41.5 mm. wide carapace (greatest width) |
| E | Also dead, largest and strongest looking of lot | 52. mm. wide |

August 5, 1930 - Continued

- Put new animals in each jar except deep salt water large crab, which
- A₂ escaped me yesterday and which Dexter found very much alive in
 Large tub on dock this a.m. Had climbed over pile of ropes and was still
 crab very strong and active this morning. Dead at 9:20 after putting in
 salt water. ♂ 50.5 mm. greatest width of carapace
- B₂ Same crab as on Aug. 5, still alive, shallow salt.
- C₂ New crab from wiere cage control immersed in salt water control.
 Deep fresh water.
- D₂ Shallow fresh. New crab/^{from}control.
- E₂ Dry jar. New crab from control.
- C₂, D₂, and E₂ all about same size, small crabs.
 C₂ with very few legs.

#42 - 30 Was collected Aug. 4, 1930, color noted Aug. 5, 1930.

Dexter brought me two crabs from Fort, a *Panopeus herbstii* of slaty blue and a spider with purple ascidian on back. Latter crab color noted. Beneath the ascidian, either side as viewed from below, a sponge. As soon as I put crab in formalin, a pretty good sized amphipod dropped off.

August 5, 1930 - Continued

From off floating plank of barnacles tied to laboratory dock got few very young *Pachygrapsus* and 3 worms picked. Worms largely brownish, body lighter.

From a lobster carapace that Visscher put out in small boat-shaped live car to skeletonize after partly drying shook a lot of *Nebalia*. Soaked up nicely in water and he gave me some for Museum.

August 5, 1930 - Continued

At 10:00 a.m. C₂ crab in deep fresh water had keeled over on bottom of jar; was unresponsive to poking or moving about with forceps. Picked him out of water and took in hand for pickling, when I noticed bubbling noise below maxillipeds. Dropped him back in water. Was not out more than a few seconds, but was enough to revive it that it moved about on bottom of jar when disturbed; had shed one of its few remaining legs.

Other crabs all seemed O.K. at 10:00 a.m.

At 10:35 a.m. all seemed O.K. except one in fresh water seemed ~~was~~ down and out, even when picked up and turned over under water showed no real signs of life, but on taking out felt bubbling to start up after few seconds, and in 3-4 mins. shoed ^w additional bubbling. Put in dry jar.

11:00 a.m. Crab in deep fresh water did not revive after all. Young male, 30.8 mm. wide, with both chelipeds and just two ambulatories, having shed others in jar.

All O.K. at 12:00 and 1:00 o'clock.

Returned at 4:30 p.m., and crab in dry jar, E₂, was dead. Male carapace 31.5 mm. wide.

August 6, 1930.

7:00 a.m. Salt and shallow fresh water crabs O.K. Looked at about each hour--O.K.

At 11:00 a.m. crab in fresh water had cast three legs and was bubbling profusely.

12:30 Fresh water crab quite feeble.

2:00 p.m. Dead! Male carapace 36 mm. wide, only two ambulatories and chelae left. Salt water crab still alive.

3:30 p.m. Salt water crab still good, changed water on him.

August 7, 1930

Crab in shallow salt water still active and growing well.

At 11:15 Dexter brought me a fairly large, healthy looking Grapsus. Put it into a dry jar at this time, 11:30 a.m.

August 8, 1930

Dry crab of Aug. 7 and shallow salt still O.K. at 1:00 p.m.

Dry ~~xxaxad~~ crab dead at 7:00. May have died about 3:00 p.m. Salt water one still good.

August 10, 1930

Died between 11:00 and 3:00. End of salt water crab.

36 mm. wide ♂? or ♀?

August 5, 1930

#43-30.

Went digging for Callianassa in bight Long Key makes with the reef. Three specs. color noted, and claws only of 2 more. Got a new Squilla (was dug up with shovel while digging for Callianassa) and a striped Clibanarius was on surface of mud. Squilla was dug up with shovel while digging for Callianassa.

#44 - 30.

Several small shrimps that Visscher picked off overturned rocks on Bird Key Reef, August 5, 1930. Color noted. Also gave me some barnacles ~~for~~ from P. argus Dexter speared near here.

August 6, 1930

Color noted various Portunids. Mail day. Sort of a semi-semi-official holiday. Everybody wanting to lay off but none wanting to admit it.

August 7, 1930.

7:30 a.m. Crab in shallow salt water still doing well.

Got a few more Nebalia from lobster heads (and carapaces) in live car at dock, west side. Alimentary tract throughout from mouth & ? protruded feces saturn red, eyes bay but no other color, body transparent. I examined these the first morning after putting out fresh head, saw nothing. Second day poured liquid and water of 1 head over dish and got about 19. Visscher got his lot on third day. Shall see what tomorrow brings forth.

#44 -30 . Seining beach, Long Key.

Collected over flat where I got Callianassa yesterday. Saw a large brownish-yellow C. acanthochirus in large hole; came up and snapped claws when I spilled a little sand in it.

August 7, 1930 - Continued

Dug up several similar holes; got *Squilla* of species in #43-30 (Aug. 5, 1930). Color noted.

Watched another hole. Tiny blue and yellow fish played in and out, dropped in some sand and raised little Xanthid. Tried to catch, but he literally tumbled in, out of sight, in an instant. After a little he came out again, and, whether you believe it or not, he tried, rather began moving some of the pieces of coral lying about hole into it, rather over it. As can be noticed, some holes are thus more or less concealed by coral fragments. Just got out and sort of back under lumps and they slide down slopes of shallow (funnel) or depression at bottom of which hole lies.

Also shovelled out an *Arenicola* and one long, thin worm (part at least). In my excavating turned up five small Crangons, four of one species, one of another, color noted, and picked up with bit of sand on tip of shovel the place where a little Portunid or Xanthid rushed into concealment and so got the fellow.

August 8, 1930. In channel between middle ground and white shoal.

Left lab at 7:55 a.m. Sound 10 fms. off fort buoy marked on chart. Net on bottom at 8:30, haul up at ~~8:45~~ 9:00. Course: for 1/2 distance N.W., other half W. N.W. No. 8 buoy at end W. S.W.

Sponges galore (sticky bottom). No shells, number of Xanthids, 3 species quite different colored *Synalpheus*, 2 yellow kinds, one with blue other with pink fingers, and two red ones with green fingers = 1 kind. Portunids.

August 8, 1930 - Continued

#46 - 30. Along E. side Loggerhead Key.

Net over at 9:20 a.m., haul in at 9:45. Av. 10 fms. Course noted on chart: S.W. x S. Weedy bottom, lots of Dictyota, number of Podocheilas, Portunids.

#47 - 30. Channel haul east side Loggerhead Key.

Net down at 10:05, start up at 10:35.

Course on chart: S.W. x S. 1/2 S. between 10-11 fms. east side Loggerhead Key. Loggerhead light N.N.W. at end of haul.

Also weedy bottom as before, haul looked much like it; but both #46-30 and #47-30 are quite different from #45-30.

August 9, 1930

#48 - 30.

Net on bottom at 8:25. Loggerhead Light W.N.W. ^{from ship} Start haul up at 8:49 a.m. Course for 5 mins. little W. of S.; for 25 mins. S.W. 1/2 S.

#49 - 30.

Empty haul, 1/2 speed, 9:00 - 9:30, sub surface attempt for fish. Was 49 but # cancelled; was empty haul, but remembered hauls, so that 49 was orig. 50. Haul along east side of White shoal. Net down at 9:40 just below S. of C.3 buoy. Net started up at 10:10. 30-min. haul.

#50 - 30.

Net over at 10:30, start up at 11:00 a.m.. Red No. 8 buoy W.S.W. In Brilliant Shoal channel.

August 10, 1930.

Cleaned up Aug. ~~x10~~ 8 dredge hauls.

August 11, 1930, Monday

Lab work all day.

August 12, 1930, Tuesday.

Lab work forenoon. Went out crabbing in afternoon for "sand Portunids" for Dr. Longley. Got 12 ornatus and one more without chelipeds, and four little *P. depressifrons* in about 10 hauls of seine, 4 of ornatus with dip net, and Billy got a *Pseudosquilla ciliata* with dip net.

Went out with electric light between dark (after sunset) and moonrise, effect of which was delayed by heavy clouds in front. Fish between 8:30 and 10:00. Got number of flying fish and several plankton samples, worms, too, and 1 shrimp. Color noted.

August 12, 1930.

Large *Cenobita* Billy had originally Visscher found again. This had hand of large cheliped from middle of fore edge of carpus to end of fixed finger 40 mm. long. Fixed finger closed from base of articulation on upper edge to tip 21 mm. long. Greatest width of large hand 32 mm. This crab found on Loggerhead Key.

August 13, 1930. & Aug. 14, 1930

Worked over rocks and weeds from Dr. Graves' live car and from other live car, lobster head for *Nebalia*, also got an ostracod from Graves' live car material.

August 14, 1930

Went ^{over} with hood first in 20 foot hole in reef well west of lab. dock. Quite wild scenery and lots of holes, nooks, and crannies. Ears hurt so much when I first went down I thought I'd have to come up again, but soon got better so that I didn't notice them.

Aug. 14, 1930 - Continued

If fingers are tender or skin is scratched or broken, Millepora gives quite a bite, painful as formalin in cut fingers. Also through khaki pants if you sit on it. Fishermen and Key Westers call it pepper coral; not a bad name.

Alcyonarians give off a pungent, acrid substance. Can smell it in water, and after some rough weather one can appreciate it on or in water while swimming.

August 16, 1930, Saturday.

A day of misc. much and nothing. In afternoon, while packing and fiddling, Dr. Longley asked me is this Saturday or Sunday. I answered Sat. Oh! said he, I thought it might be Sunday. (By way of reminder?) However, Gowanlock went out with launch for another sunning and so escaped special notice or got credit for being busy!

The *C. marginatus* I saw in tide pool yesterday evening while walking around island with Bullington and Visscher I did not see this a.m., nor on two later visits this p.m. after supper, both before and after sunset. I don't know how outside of claws are colored, but inside largely china blue and white. Paddles particularly and paddles a sort of rufous and the carapace is mottled in roughly circular areas of a tan (rufous category) and blue-black and black blue green, I guess. Nothing very striking at distance.

Between 10:00 and 11:00 went with Dr. Longley to put charge of dynamite in sandy mud flat of seining beach at Long Key. Blew a 4-foot diameter hole about $2\frac{1}{2}$ - 3 feet down, but got nothing much, though I raked around considerably with dip net sifting through sand and mud and sorting over remaining coral fragments. Got about six of odd little Squillas I dug up with Callianassas and some days ago, a Crangon, and 2 Upogebias, /a small Peneus. Color noted the last two items.

August 16, 1930 - Continued

The 13 boy scouts and five adults that came down with them to stay a week ~~at~~ at the Fort did not get along so well with the brackish water in the cisterns and so begged lab to rescue them and set them on Loggerhead Key where they could stay in lighthouse boat shed. Such a bunch of junk they seemed to have. We got them safely over, but before we called for them a Coast Guard cutter had called and ordered them off. (Where to, goodness only knows.) But as they could say ~~they~~ they were going over to Loggerhead, everything was all right. Should have gotten permission of Naval (or Coast Guard) Commander at Key West before coming out for visit.

Had bonfire on beach tonight.